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PREPARATORY COMMITTEE FOR THE
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PREPARATIONS FOR THE UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT ON THE BASIS OF GENERAL ASSEMBLY RESOLUTION 44/228 AND TAKING INTO ACCOUNT OTHER RELEVANT GENERAL ASSEMBLY RESOLUTIONS: RELEVANT ACTIONS OF INTERGOVERNMENTAL AND OTHER BODIES OF RELEVANCE TO THE PREPARATORY PROCESS

Protection and promotion of human health

(Section I, chapter 5 of Agenda 21)

Note of the Secretary-General of the Conference

1. The World Health Organization Commission on Health and the Environment was appointed in early 1990 and concluded its work in October 1991. Its task was to make an inventory of the present knowledge of the impacts of environmental changes on human health, to indicate areas where further research was needed, and to lay the basis for developing strategies to tackle problems of health and the environment in the future.

2. The Commission was established to follow up the report of the World Commission on Environment and Development and to provide a direct input to the preparations for the United Nations Conference on Environment and Development, particularly with regard to human health aspects of Agenda 21. Consequently, the findings and recommendations of the Commission were duly taken into consideration when document A/CONF.151/PC/100/Add.5 was prepared.

3. The summary of the report of the Commission is annexed to the present note.

ANNEX

Summary of the report of the World Health Organization Commission on Health and the Environment*

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* The annex is circulated in the languages of submission only.

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Preface

The WHO Commission on Health and Environment was appointed by the Director-General of WHO as a fully independent body in early 1990. Composed of 22 members (Annex 1), the Commission was chaired by Madame Simone Veil, France, Member of the European Parliament. H.E. Dr E. Salim, Minister of State for Population and the Environment, Indonesia, and Professor N.F. Izmerov, of the Academy of Medical Sciences of the USSR, served as Vice-Chairmen.

The work of the WHO Commission can be regarded as a follow-up of the 1987 report, Our common future, of the World Commission on Environment and Development (WCED). That report reviewed the relationship between the environment and development, and methods of assuring the progress of mankind while respecting the environment so as to make it possible to bequeath it in a healthy condition to future generations. Although the relationship with health was not considered in detail in the WCED report, concern for health underlay most of it. It therefore seemed opportune, three years later, for an independent body to make an assessment of the health consequences of environmental change, especially in anticipation of the United Nations Conference on Environment and Development which will be held in Brazil in 1992. The Director-General considers the report of the Commission on Health and Environment to be WHO's main contribution to that Conference, one that underlines the importance of health in environmentally sound and sustainable development.

The Commission had the support of four independent expert panels appointed by the Director-General, on food and agriculture, energy, industry, and urbanization - four areas that cover the main aspects of development. Professor E.H. Kampelmacher (Netherlands), Dr B.H. MacGibbon (United Kingdom), Dr B.D. Goldstein (USA) and Mr M. Diop (Senegal) were appointed respectively chairmen of the food and agriculture, energy, industry and urbanization panels. In the absence of Mr Diop, Dr B.W. Christmas (New Zealand) chaired the panel on urbanization.

The Commission held three meetings. The first (June 1990) was devoted to planning the work of the panels, the second (March 1991) to developing the structure of its report, and the third (July 1991) to the drafting and adoption of the report. While the Commission takes full responsibility for its own report, it acknowledges that much of it is based on the reports that the panels

prepared under their own responsibility. Any discrepancy between the panels' and the Commission's conclusions and recommendations must therefore be attributed to the fact that Commission and panels worked independently of each other, the panels, owing to their mandate, taking a more sectoral approach than the Commission.

The meetings of the Commission were attended by representatives of a number of United Nations Organizations, other international organizations, and nongovernmental organizations.

The Commission wishes to express its indebtedness to Mr D.E. Satterthwaite, who was responsible for the preparation of the first draft of the report and gave invaluable assistance to the Commission throughout its work.

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Health and the environment

The maintenance and improvement of health should be at the centre of concern about the environment and development. Yet they rarely receive high priority in environmental policies and development plans. They rarely figure as important items in environmental or development programmes, despite the fact that the quality of the environment and the nature of development are major determinants of health.

Indeed, the most immediate problems in the world are ill health and premature death caused by biological agents in the human environment: in water, food, air, and soil. They contribute to the premature death of millions of people (mostly infants and children) and to the ill health or disability of hundreds of millions more. The problem is most acute in the developing countries where:

- four million infants or children die every year from diarrhoeal diseases, largely as a result of contaminated food or water.
- two million people die from malaria each year and 267 million are infected.
- hundreds of millions suffer from debilitating intestinal parasitic infestations.

Serious environmental health problems are shared by both developed and developing countries, affecting:

- hundreds of millions of people who suffer from respiratory and other diseases caused or exacerbated by biological and chemical agents, including tobacco smoke, in the air, both indoors and outdoors.
- hundreds of millions who are exposed to unnecessary chemical and physical hazards in their home, workplace, or wider environment (including 500 000 who die and tens of millions more who are injured by road accidents each year).

Health also depends on whether people can obtain food, water, and shelter. Over 1000 million people lack the income or land to meet such basic needs. Hundreds of millions suffer from undernutrition.

It is a requirement of health that the global cycles and systems on which all life depends are sustained. Population growth and the

way resources are exploited and wastes generated threaten the environmental base on which health and survival depend and transmit the growing costs to future generations. The toll they exact on human health and natural resources and systems could be enormously reduced by better environmental management.

Integrating development, the environment, and health

Health depends on our ability to understand and manage the interaction between human activities and the physical and biological environment. We have the knowledge for this but have failed to act on it, although we have the resources to meet current and future needs sustainably.

Two concerns are vital: development addressing people's needs, especially for health; and ecological sustainability so that natural resources are not depleted and natural systems not damaged or degraded. Meeting the needs of the present and future world population for food, water, and energy without depleting or damaging the global resource base, while avoiding the adverse health and environmental consequences of industrialization and uncontrolled urbanization, can be achieved only if people have the knowledge and the means to influence action. This calls for changes in the way governments plan ar manage development. In agriculture, research and extension services are required that are more participatory and more responsive to the needs of poor farmers. In urban areas participatory partnerships between local authorities and community organizations need to be developed. People dependent on natural resources should be fully involved in decisions about their use and protection. All groups, including those who are living and working in the least healthy environments or are currently excluded from decisions about how resources should be used, should share in decision-making and action.

Local participation needs national and global frameworks to ensure that adequate knowledge and resources are available and that local actions do not result in an unsustainable burden on natural cycles and systems. It also requires inter-governmental agreements that limit each country's call on finite resources and its right to dispose at will of non-biodegradable wastes. For this, we need people whose concerns go beyond the quality of their own environment; only they can press their governments to reach the international consensus on which a healthy and sustainable planet depends.

Global challenges to health and the environment

Any discussion of health, the environment, and development must include consideration of the size of the population and its consumption level, since this combination largely determines the impact that the human population makes on the environment. It must include the distribution of income and assets, the prime concern being for people whose health is impaired by lack of them. It must also include the macroeconomic framework within which governments set their economic, social, and environmental policies. While the priority is to change the sectoral policies of governments and international agencies so as to promote health and sustainability, macroeconomic policies affect all sectoral policies.

Population

The world's population grew more than fivefold between 1800 and 1990 to reach over 5000 million; projections suggest 8000 million by 2020. In developing countries, where populations are still expanding, pressure on scarce resources has made it difficult to improve living conditions; in the towns and cities the authorities have rarely been able to provide the extra services required by the rapid growth in population. In developed countries, where population levels are largely static, prosperity has given rise to increased consumption and even overconsumption with insufficient regard being paid to their possible planetary impact: the depletion of non-renewable resources, the degradation of soil and water resources, and the emission of gases that threaten climatic stability and the stratospheric ozone layer. Such consumption levels raise the question of sustainability, especially as a growing proportion of the world's population aspires to comparable levels of consumption.

Healthier environments and lower death rates are not inconsistent with the goal of reducing population growth rates. Indeed, the steps that reduce infant and child deaths also tend to encourage reduced fertility rates: a secure livelihood, better health and education of the mothers, improved water supplies, sanitation, and nutrition, all coupled with effective family planning programmes integrated into health care systems available to all. Where serious measures are taken for a sustained reduction in child mortality, the fertility rates eventually fall. Sustaining reductions in fertility requires policies that remove the economic necessity for poorer groups to have large families. But the pressure on resources of growing populations and growing consumption levels is so severe that to wait for economic expansion to reduce fertility would be disastrous.

Provision of a secure livelihood, education, and health care (including the means to control fertility) is therefore a high priority.

Poverty

At least 1 115 million people were classified as poor in 1985 and 630 million of these were living in extreme poverty. Such statistics cover only those with an inadequate income. The number lacking a minimum standard of living is much higher. Those who cannot read, obtain clean water, or avoid environmentally induced disease, and who are permanently under the threat of physical violence and the effects of crime are invariably poor, whatever their income. So too are those who cannot participate in community life or expect to live beyond the age of 60. If poverty is measured by the number of people lacking a standard of living that includes adequate food, safe and sufficient water, sanitation, a secure shelter, and access to education and health care, over 2 000 million people live in poverty - some 40% of the world's population. A high proportion are women and children, who are more vulnerable to environmental health risks. Within households it is generally women who look after the children, manage the household, and care for the sick; as such they suffer more from the diseases associated with inadequate water and sanitation and from the defects in the provision of basic services. Women who head households also usually face discrimination in looking for jobs and in obtaining access to public services, housing, and credit.

Resource use

The impact of any population on the environment depends on the type and level of its resource use and on its waste generation and management. Most of the world's consumption of non-renewable resources is concentrated in Europe, North America, and Japan. Per caput consumption levels in the richest countries are 50 or more times higher than in the poorest countries. The OECD nations, with 15% of the world's population, are responsible for 77% of all hazardous industrial waste. More than 80% of the gases in the atmosphere that contribute to the greenhouse effect, arise from production or consumption in the developed world.

A healthy population may require a relatively prosperous and stable economy, but this need not imply the levels of income and resource consumption common in developed countries. Many communities with a relatively low level of income have made substantial improvements in health; some have achieved a life expectancy close to that of West Europe and North America with a much lower level of resource use. Improved health can be separated from ever increasing consumption if development programmes stress

the promotion of health both in the narrow sense of curing or preventing disease and in the broad sense of promoting well-being and informed participation.

Macroeconomic frameworks

Macroeconomic policies are major influences on the state of health and of the environment within all countries. But they are usually established with little or no consideration given to their health or environmental consequences. For example, trade and fiscal policy or agricultural or energy pricing may influence health either by their effect on income levels and distribution or by the effect on the quantity and quality of land, air, and water resources. Macroeconomic policies influence the extent to which health care and health-related services are funded. They also affect the size of household incomes, and hence the quality of food and housing affordable.

Macroeconomic policies should minimize conflicts between economic, environmental, and health goals. With increased knowledge of the social and environmental effects of macroeconomic policies, the effects can be limited, including those which arise from structural adjustment, and special programmes can be established for those whose health might otherwise suffer from loss of income or cuts in services - for instance health care or nutrition programmes or employment projects.

Food and agriculture

Agriculture, forestry and fishing provide not only the food and natural resources on which human society depends but also the livelihood of about half of the world's population. Their output can only be sustained if the ecological systems on which they draw are not overexploited.

The output of the world's food-producing systems has greatly increased over the past few decades. As yet there is no global shortage of food or the capacity to produce it in the world. But for a large part of the world's population undernutrition and the infections associated with it will remain the main cause of ill health and premature death because they lack the land to grow the food they need or the income to purchase it. Foodborne diseases are among the most common diseases in every country, although they are far less often life-threatening in developed countries. Most disease agents that contaminate food and water are biological and come from human or animal excreta, although food contaminated by toxins produced by

plants and moulds and those present in fish and shellfish can be a serious problem.

The ecological base for feeding the world's population is under stress owing to the rapid degradation of land and water resources. Production and distribution methods remain inefficient, as is shown by the size of the losses before and after harvesting. A continued rise in the populations in virtually all developing countries, greater substitution of meat, eggs and dairy products for grains and vegetables, and increased food and soil losses put great stress on farmers and on the ecological underpinnings of farming systems. Conversely, reduced population growth, better balanced diets, changes in production techniques, and greater attention to reducing food losses make it possible for farmers to sustain production and meet future demands.

Agriculture is not without occupational health risks, of which accidents, infection with diseases spread by animals, and exposure to agricultural chemicals are the most common. In tropical countries, reservoirs and water supply and canals for irrigation have been constructed and new land opened up for agricultural use without proper control of disease vectors. The result is that they have often been followed by a great increase in many of the most lethal and debilitating diseases, including malaria and schistosomiasis.

Agricultural chemicals are widely misused, most seriously in developing countries where pesticide regulations and their enforcement are less strict and products that have been banned or restricted in developed countries are still widely available. Agricultural chemicals are damaging water resources. Drainage water often contains high levels of salts and nutrients, the latter causing blooms of algae in lakes, reservoirs, and shallow coastal waters.

Health and its environmental determinants are closely related to land tenure. Farmers with secure tenure of adequate amounts of fertile land usually avoid extreme poverty and the ill health that accompanies it. Those with little security and too little with land or with holdings of only marginal productivity are often poor; so is their health. Many small farmers have developed a sophisticated knowledge of how to sustain yields in difficult circumstances. However, environmental degradation is common where high concentrations of poor farmers have only land of poor quality to exploit.

Certain strategic principles can promote health and more sustainable patterns of food production. They include the promotion of good agricultural practice (for instance, crop rotation, avoidance of

excessive fertilizer application, use of correct dosage of chemicals for pesticides, reduction of food losses before and after harvesting). They also include wider use of integrated pest control and better integration of farming, forestry, and water resource management. Several major innovations are likely to prove of particular importance for increased food production or better preservation; they include food irradiation and the use of modern biotechnology to improve productivity and processing.

The Commission recommended that:

- countries should take steps to ensure that all households can afford and obtain an adequate diet; and in particular that income and employment programmes should play a role in ensuring that everyone has the means to acquire sufficient food.

- efforts to increase food production should be accompanied by measures to protect and enhance land and water resources.

- research and extension services should be more participatory, more responsive to the needs of small and poor farmers, including those dependent on poor-quality or fragile land, and give more attention to health and environmental issues.

- governments should integrate health goals in their agricultural policies, including promotion of the health of farmers and agricultural workers.

- more research should be carried out on how to increase food production in the tropics while reducing tropical diseases and harmful effects on the environment.

- governments should give high priority to reducing food losses before and after harvesting.

Water

Fresh water is considered a renewable source, but there are limits on the supplies available. In many countries or regions shortages of fresh water are the main obstacle to agricultural and industrial production. Some of such shortages (or seasonal or annual variations in supplies) lead to poverty and soil degradation. Many cities and agricultural regions are now drawing supplies from

underground aquifers at a rate far above their natural rate of recharge.

Fresh water is essential to health not only for its part in production but also for domestic consumption and use (drinking, cooking, washing, laundry). A high proportion of life-threatening and health-threatening infections are transmitted through contaminated water or food. Nearly half the world's population suffers from diseases associated with insufficient or contaminated water, mostly the poor and virtually all in developing countries. Two thousand million people are at risk from waterborne and foodborne diarrhoeal diseases, which are the main cause of more than five million child deaths each year. Schistosomiasis (200 million people infected through contact with contaminated fresh water) and guinea-worm (10 million infected through drinking water containing the microscopic disease vector) are two water-based diseases. Insect vectors breeding in water transmit malaria (267 million infected), filariasis (90 million infected), onchocerciasis (18 million infected), and dengue fever (30-60 million infected every year).

Water shortages usually lead to problems of water quality since sewage, industrial effluents, and agricultural and urban runoff overload the capacity of water bodies to break down biodegradable wastes and dilute non-biodegradable ones. Water pollution problems are most serious in cities in developing countries where controls on industrial emissions are not enforced and sewers, drains, or sewage treatment plants are lacking. Sewage and industrial effluents can be treated before disposal if sewers exist and the regulatory authorities are effective. Agricultural and urban runoff cannot be treated and in many areas in both developed and developing countries it is a growing threat to the quality of lakes, rivers, and the groundwater. Fisheries have been damaged and drinking-water sources contaminated by pollution in many areas of the world.

The Commission stressed that:

- Fresh water should be considered as a scarce, valuable, and finite resource and water resource management should be promoted to reconcile competing demands from different sectors and consumers.

- Because of the immense effect of water-related diseases on human health, a greater priority should be given not only to ensuring safe and sufficient water supplies but also to sanitation and to increased education about personal hygiene. Improving the quantity and quality of water and providing safe excreta disposal services are usually possible at relatively low

cost, especially if optimal use is made of local knowledge and resources and the users are fully involved in the design, implementation, and management of the services provided.

- Fresh water should be priced and protected in accordance with its value to health and to production. Innovative schemes can often reach poorer groups with major improvements at a cost they can afford. Preferential tariffs or subsidies should be avoided for most consumers and used only to ensure that the poorest receive a level of service sufficient for health.

- The priority for water pollution control in the world is the control of bacteriological and parasitic waterborne diseases, but contamination of water by heavy metals and other chemicals should also be prevented or minimized.

- More emphasis should be placed on making the best use of existing water supplies; drinking water shortages can often be remedied by greater attention to maintenance (since up to 60% of water supplies in a piped system may be lost in leaks) and by charging the users of the largest amounts of water a realistic price.

Energy

The main goals of energy development have been to reduce the cost of producing energy, to make systems more efficient, and to open up previously untapped energy sources. Reducing the adverse environmental and health effects has also become a goal. More recently, concern about climatic change has emerged since the combustion of fossil fuels, which accounts for nearly 90% of the world's commercial energy production, is the largest source of the so-called greenhouse gases.

People in developed countries use roughly ten times more commercial energy than those in developing countries and burn 70% of all the fossil fuel used, most of it for electricity generation, industry, transport, and domestic heating. To strengthen their economies and so provide the economic basis for good health, most developing countries will need to increase their fossil fuel consumption.

One of the Commission's central concerns was whether the need for developing countries to increase their use of fossil fuel can be met at the same time as the adverse health effects are reduced,

especially indoor air pollution from coal and urban air pollution from fossil fuel use, within a global agreement that limits greenhouse gas emissions.

Fossil fuels are the single largest source of atmospheric pollution; when burnt, they release in the air particulate matter, carbon monoxide and dioxide, oxides of nitrogen and sulfur, and metal compounds. More than 1 000 million city dwellers are now exposed to high levels of air pollution. High levels of sulfur dioxide and particulates in urban areas have been associated with respiratory disease and increased mortality. Vehicle exhausts pollute the air in large cities with carbon monoxide and with lead (except where lead additives to petrol are no longer used). Exposure to the latter may impair mental development in children. Vehicle emissions also contribute to the formation of ozone and photochemical smog, which may decrease lung performance. Several studies have shown an association between levels of air pollution and respiratory symptoms, but it is still uncertain whether protracted exposure to low levels of air pollutants such as occur in many cities of the developed and developing world has any long-term effects on health. However, policies, regulations, and incentives can greatly reduce air pollution and increase the efficiency with which fossil fuels are used. Their adoption in many developed countries has improved air quality in a number of cities in recent years.

Indoor air pollution from the combustion of coal or unprocessed biomass fuels (e.g., wood, crop wastes) represents perhaps the largest energy-related source of ill health. Biomass fuels are used to meet the energy needs of nearly half the world population. They are often burnt in open fires or inefficient stoves in poorly ventilated houses, and give off smoke and chemicals that contribute to respiratory disease, with long term cardiovascular effects. Because of the presence of known carcinogens in the indoor air, an increased risk of lung cancer must be assumed. Women are generally responsible for cooking and looking after children in the home and they and their children are at greatest risk.

There are a number of alternatives to fossil fuels and unprocessed biomass, including hydropower, nuclear energy, and solar power. Hydropower can bring extra benefits such as flood control and an increased supply of water for drinking and irrigation. However, dams can cause environmental changes that affect health: people living in the flooded area must be resettled, the quality and reliability of the water supply downstream are often reduced and, in the absence of appropriate control measures, the large area of water behind the dam can become a breeding ground for disease vectors (including those of schistosomiasis and malaria). Smaller hydro-systems that

draw power direct from flowing rivers can avoid most of these health, social, and environmental costs.

Nuclear energy is another option. Under normal working conditions discharges from power plants result in exposures to levels of radiation about 1 000 times lower than natural background levels. However, the risk of accidents and the difficulty of safely disposing of high level radioactive waste are major concerns of the public. Moreover, nuclear power is rarely an appropriate choice for developing countries. The use of direct solar and wind energy is likely to increase, although it will be limited by cost and space requirements.

Electricity use is likely to continue growing rapidly, since it provides the energy for virtually all communications and most lighting and mechanical work apart from road transport, and is essential to development and to the operation of medical services. The expansion of electricity supplies has led to increased exposure of the population to electromagnetic fields. Only since 1979 has it been suggested that such exposure may increase the risk of some cancers. No clear evidence has been obtained that such exposure is harmful, but the possibility requires investigation.

The Commission stressed five priorities for a national strategy:

- The reduction of indoor air pollution from the domestic use of coal or unprocessed biomass fuels in developing countries (e.g., by the use of improved stoves and ventilation), the local adoption of biomass processing techniques to produce cleaner fuels, or a switch to cleaner fuels.

- The reduction of urban air pollution from the fossil fuels used for energy production and transport in both developed and developing countries by adoption of mitigating technologies at source (particularly in new thermal power plants and vehicles), improved public transport systems, and greater priority for practical alternatives to the use of petrol.

- The reduction of the potential risk of climatic change by achieving a balance between the need for increased use of fossil fuels in many developing countries and reduction in carbon dioxide emissions and acidic aerosol production from the combustion of fossil fuels in developed countries. Achieving greater energy efficiency through such measures as the wider adoption of co-generation plants and more efficient end-use devices and the wider adoption of energy conservation

measures should be the goal in both developed and developing countries.

- More resources for research and development and wider use of renewable energy sources aimed at lowering the costs of waste incineration, and at exploiting solar and wind power and the possibilities of small-scale hydro-electricity generation.

- Continuing research and development on major accident prevention, particularly the development of inherently safe nuclear reactors. Developing the capacity for the safe transport and storage of high-level nuclear waste is an important safety issue.

Industry

Industrialization has made many positive contributions to health, among them increased personal incomes, greater social wealth, and improved services, particularly transport and communication. But industrial activities carry the risk of adverse health consequences for the workforce and the general population, either directly through exposure to harmful agents or practices or indirectly through environmental degradation. Industrial emissions and products also threaten the global environment.

Industrial practices in both developed and developing countries produce adverse environmental health consequences through the release of air and water pollutants and the generation of hazardous wastes. Occupational diseases include silicosis, pneumoconiosis, lead and mercury poisoning, hearing loss, and skin diseases. Serious health risks are also faced by workers in small-scale or cottage industries, where exposure to toxic chemicals and accident rates are often higher than in large industries.

Industrial emissions have polluted many rivers, lakes, and coastal environments, especially in developing countries where pollution control is rarely enforced. A number of major accidents in developing countries such as the release of chemicals or explosions have been dramatic reminders of the adverse health effects of inadequate attention to safety and prevention. Only in a minority of countries are potentially dangerous industries sited away from population concentrations. In most countries too little attention is given to controlling the disposal of hazardous industrial and commercial waste so as to prevent human exposure and leakage into the environment.

There is a serious lack of quantitative data on the links between environmental agents and health effects. It has been difficult to establish the relation between industrial emissions, and especially long-term low-dose exposure to them, and the health of the general population because factors other than industrial pollution are implicated. More is known about health risks inside industry and this information has contributed to the identification of health risks for the general public. Health problems are most severe in developing countries, where fewer health standards are applied to limit workplace exposure. Even where standards exist, many nations have neither the funds nor the institutional structure to ensure that they are upheld. Partly for these reasons, there has been a transfer of some hazardous industries to developing countries.

The Commission stressed the need in each country for:

- a planning process where health and environmental considerations influence decisions about plant siting, design characteristics, the choice of process, and the incorporation of safety and pollution control devices

- the adoption of "the polluter pays" principle to control liquid and gaseous emissions and placing the full responsibility on the producers of hazardous wastes

- a higher priority for the control of air and water pollution, including fitting control technology on existing plants to protect the health of the workers and the public; the direct and indirect costs of health effects should be included in decisions about the economic feasibility of such controls

- more attention to monitoring the release of industrial discharges and quantifying the health and environmental effects, concentrating on susceptible populations and on the long-term as well as the short-term consequences

- educational and training activities for six groups: health care professionals, particularly in developing countries; workers and managers in health and safety and in the prevention of environmental releases and the reduction of wastes; decision-makers, who need to incorporate health and environmental costs into decisions; journalists and other workers in the media; the public and especially schoolchildren, to increase their understanding of environmental problems; and experts, including environmental scientists, to train and give advice to the other groups

- addressing the occupational and environmental health problems in small-scale industries

- adherence to global agreements on the management of wastes to prevent transport accidents and the export of hazardous industries or hazardous wastes

- increased understanding of the interaction between chemical or physical agents and biological systems so as to improve recognition, and prediction of the consequences of industrial releases. The use of area profiles within which exposure data and health manifestations are carefully monitored over many years will help such understanding.

Human settlements, urbanization, and basic services

Environmental management is needed in all settlements to provide water, protect public spaces, remove wastes, and protect air and water quality. Even in a small village water sources must be protected, and all households must be ensured sufficient water. Human and animal excreta must be disposed of in ways that minimize the possibility of human infection and of food and water contamination. As a settlement's population size and density increase from village to market town to major city, so too do the scale and complexity of the environmental management needed to ensure a healthy environment.

Rapidly growing urban centres are a particular challenge for environmental health. Urbanization is usually associated with the development of a more productive economy, and it can bring major benefits to health and the environment; the concentration of population and business lowers the unit cost of piped water and health services, sanitation, and the collection and treatment of household and commercial wastes. But in the absence of government action to ensure that the infrastructure and services are in place and pollution controlled, environmental health problems are greatly exacerbated.

These problems are particularly apparent in developing countries. Despite some slowing of the growth rates in many major cities in recent years, population growth still outstrips the ability of local authorities to provide even minimal levels of service. Local governments are often hampered in their efforts by a weak revenue

base, poor financial management, and few trained personnel, and by budget cutbacks that cause a further decline in the coverage and quality of the water, sanitation, refuse collection, and health care services.

Housing problems are widely different in developed and developing countries. In the former the major issues concern the design, the physical structure, and the living environments of poor quality that are associated with physical and psychosocial health problems contributing significantly to ill health in the urban areas affected. Legislation exists to ensure adequate standards in many of the areas listed above, but improved building and safety standards are still needed.

Housing should contribute to a sense of well-being and security. Poor housing is associated with social and psychological problems, including alienation, isolation, drug abuse, family break-up, and urban violence. Strong community networks can act as a buffer against the psychosocial effects of poor physical environments. Action to improve psychosocial health often combines improved services and employment opportunities. A related issue is noise, at home and at work, which can result in hearing loss, sleep disturbance, impaired mental performance, increased anxiety, and aggression.

Much of the housing in both the rural and the urban areas of developing countries lacks the most basic requirements for health. More than 2 000 million people live in life-threatening and health-threatening housing and living environments. Most of the housing is overcrowded; space is nearly always at a premium, and many families live in one-room shelters or single rooms in tenements. Such overcrowding encourages the spread of acute respiratory infections, tuberculosis, meningitis, and intestinal parasites. Four or more persons to a room make it almost impossible to protect infants and children from burns or scalds and to store safely hazardous household substances such as bleach or kerosene. In urban areas a high proportion of housing is illegal settlements built of flammable materials; many dwellings are built on land prone to flooding, on steep hillsides or otherwise dangerous sites. The low commercial value of such sites means that the inhabitants have a greater chance of not being evicted.

Most of the poor have incomes that are too low to enable them to afford better housing with adequate space, security and services. Fear of eviction is a constant worry for most tenants and inhabitants of illegal settlements. The risk of infection, particularly from pathogens associated with excreta, is high. Most illegal settlements have only rudimentary water supply systems and no sewers or drains.

An estimated 30-50% of the solid wastes generated in urban areas in developing countries is left uncollected.

Most poor people in developing countries have no health service to turn to when they are sick or injured. Some 1 600 million have no access to health care. In the least developed countries more than half the population may have no access to health services. Health services are particularly important for vulnerable groups, especially for prevention and rapid treatment of common illnesses. Although the proportion of pregnant women and children covered by immunization has grown considerably in recent years, hundreds of millions remain unprotected and millions die each year from diseases that could be prevented by immunization. Most spending on health is still for curative services, usually in major hospitals, although preventive and community primary health care services are far more effective in reducing morbidity and mortality.

Enough knowledge and resources exist in most developing countries to improve housing and basic services at a relatively low cost. New participatory partnerships between local authorities, nongovernmental organizations, and community organizations have shown this to be so and have proved cost-effective. Institutional frameworks at national and local level are needed to encourage and support these partnerships.

The Commision's recommendations included:

- high priority for the provisioning of all forms of housing with sufficient supplies of water and services for the hygienic disposal of wastes, and for the education of their inhabitants in personal and domestic hygiene

- greater priority to ensuring that all individuals or households can afford to purchase, rent, or build adequate housing on safe sites

- the development of new urban and rural planning structures and processes that are more participatory, work with community organizations, and meet the identified health needs of the poorer groups

- higher priority for the provision of primary health care into which national population policies are fully integrated

- a much more active role by health personnel in the planning and implementation of community development projects; health personnel should have the knowledge and skills to work with

other social services, especially in the provision of child care for working and sick parents, shelter for the homeless, care for the disabled, and services to cope with violence and drug and alcohol abuse

- the development of national strategies to reduce overconsumption and waste generation and encourage resource conservation and recycling

- increased research on the health status of urban populations, on the methodologies used in successful community health projects, on low-cost appropriate technologies related to housing and services, and on the development of models allowing choices to be made between alternative methods of waste disposal.

Transboundary and international issues

Certain environmental issues have health implications on a wider scale than the local or national level. They include the long-range transport of air pollutants, the transboundary movement of hazardous products and wastes, stratospheric ozone depletion, climatic change, ocean pollution and biodiversity. Solutions are being sought mainly through intergovernmental agreements.

Acid precipitation

Sulfur and nitrogen oxides emitted from tall chimney stacks by fossil fuel-fired power stations are transported long distances, often across national boundaries. In the atmosphere they are converted to acids and eventually fall to ground as acid rain or snow. This has acidified many poorly buffered lakes and soils and contributed to forest dieback and in many places (especially Central Europe) to the destruction of large forests. Health may be affected if acidified water is used untreated in water supplies, since it contains higher concentrations of metals, e.g., copper and lead from pipes, cadmium from plumbing solder, and mercury and aluminium from soils. Progress towards reduction in atmospheric pollution in Europe is being achieved through implementation of the 1979 Convention on Long Range Transboundary Pollution and its protocols.

The ozone layer

The stratospheric ozone layer is being damaged by the release into the atmosphere of various chemicals, including

chlorofluorocarbons used in refrigerants, aerosols, plastic foam blowers and other equipment, halons used by fire fighting services, and various organic solvents. Depletion of the ozone layer is likely to lead to higher levels of biologically active ultraviolet radiation at the earth's surface. At certain wavelengths, UV radiation increases the incidence of skin cancer and cataract in humans and probably affects other organisms that have no protection against it. Small changes in recreational habits, such as the avoidance of sunbathing at midday and the use of protective clothes and creams, could do much to reduce the health risks. International efforts are being made to control the production and consumption of some of the chemicals responsible through the Montreal Protocol to the Vienna Convention on the Protection of the Ozone Layer. They should be strongly supported.

Greenhouse gases

A related issue concerns the build-up of greenhouse gases in the atmosphere, though likely to lead to global warming and a rise in the sea level. During the 1980s carbon dioxide emissions, mostly from fossil fuel combustion, were responsible for more than half of the total warming effect, and chlorofluorocarbons for a quarter. Uncertainties about the magnitude, rate, timing, and distribution of any future warming make it impossible to predict the health implications quantitatively.

Heat stress and heat stroke, which can be fatal, are a direct effect that may become more common, particularly among susceptible groups such as the old, the young, and those with cardiovascular disease. The indirect health effects, however, are likely to be much more significant. Agriculture may be affected, in some areas by increased precipitation, in others by drought and desertification. Changes in rainfall may diminish the variety of crops available and lead to or aggravate food shortages. The distribution of vectors that carry the agents of infectious diseases is likely to be affected; diseases such as malaria may spread to areas where they are currently unknown. The adverse effects would be especially serious in developing countries, where lack of human, financial, and technical resources would hinder an effective response.

The seriousness of the possible health and environmental consequences of global warming is such that every effort should be made to reduce greenhouse gas emissions now, through individual efforts and through such measures as are now being developed by the United Nations.

Hazardous wastes

Hazardous wastes are exported from developed to developing countries when the export cost is much lower than the cost of disposal in the country of origin. Disposal abroad is rarely accompanied by concern about the health of those involved or those living near disposal sites. The growing concern about the health and environmental implications led to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Once in force, this should considerably reduce the risks arising from such movement.

Oceans

Large stretches of coastal waters, especially in semi-enclosed seas and where tidal flushing is limited, are heavily polluted by industrial and domestic wastes from rivers and outfalls, land run-off, and accidental spills. Biological and chemical pollution is high near river mouths and sewage outfalls. Fishing beds and beaches in their vicinity are at particular risk of contamination. Seafood poisoning and epidemics, such as the cholera epidemic in Latin America in 1991, may result from disposal of inadequately treated effluents into the sea.

Beyond the coastal waters the open sea is still relatively unpolluted. Although contamination by metals and organic compounds can be detected, the level is not yet significant for human health, and biological contamination from domestic effluents is virtually non-existent.

The need to improve the quality of coastal waters and to preserve that of the open ocean has led to the adoption of a number of international agreements. Their extension to the many ocean areas that are not yet covered should be greatly accelerated and ways and means for their rigorous implementation should be provided.

Biodiversity

Biodiversity is acknowledged as a condition for the long-term sustainability of the environment and its current destruction must be halted. Knowledge about many species is still limited and their destruction may deprive the human population of future sources of food and medicine and of biological means of controlling pests and pathogens. However, the protection of biodiversity cannot be unconditional; there may be conflict between the need to improve health or meet necessities and the need to preserve a species. In such

instances the health cost of ensuring the survival of species that are pathogenic to human or are pests of food crops will need to be carefully taken into account. There seems for example to be little ground for preserving the human immunodeficiency, smallpox, or poliomyelitis viruses, malaria parasites, or guinea-worm. An international convention on biological diversity is currently being developed by the United Nations Environment Programme.

Strategy and Recommendations

People need to have the means to acquire the resources on which health depends: safe food and water, fuel, and a secure shelter. They need to be protected not only from physical, chemical, and biological hazards, but also from crime and violence, which are encouraged by poverty and the use of drugs, and from injuries at their place of work. A healthy environment is not only a need, it is also a right; the right to live and work in an environment conducive to physical and mental health is enshrined in the Universal Declaration of Human Rights. Everyone shares the responsibility for ensuring that this right is duly acknowledged.

Everyone shares responsibility for health and for passing on to our children a world whose resources are not depleted and whose natural systems are not degraded. There is a powerful synergy between health, environmental protection, and sustainable resource use. Individuals and societies who share the responsibility for achieving a healthy environment and managing their resources sustainably become partners in ensuring that global cycles and systems remain unimpaired.

The responsibility for action lies with individuals and with business. Governments have the responsibility of setting up the strategic and institutional framework within which action is taken. They should put in place the services, financial and other incentives, and controls that encourage individuals, households, communities, business, and bureaucracies to promote health and sustainable resource use. They should take the lead in ensuring that the levels of consumption and waste generation within their boundaries do not damage global systems and deplete resources known to be finite.

There are three main global objectives:

- Achieving a sustainable basis for health for all. This demands a slowing down and eventual halt to population growth as soon as possible, and the promotion of lifestyles and patterns of

consumption among affluent groups and developed countries that are consistent with ecological sustainability.

- Providing an environment that promotes health. This involves reducing the risk of physical, chemical, and biological hazards and ensuring that everyone has the means to acquire the resources on which health depends.

- Making all individuals and organizations aware of their responsibility for health and its environmental basis. Health professionals should take the lead in moves to improve the environment and to inform governments and the public about the health implications of development and the costs and benefits of different options to reduce health risks.

Two principles are central to a healthier and more sustainable planet: first, more equitable access to resources within and between countries; second, citizen participation. Participation can promote health and environmental quality because it provides a means of organizing action and motivating individuals and communities. It enables individuals and communities to shape policies and projects so that they meet their priorities. Involvement in planning gives people the possibility to influence choices about the use of limited resources. Primary environmental care is one way of helping communities to apply their skills and knowledge to satisfy their own needs, improve their own environment, and promote the sustainable use of resources. Participatory political structures are a check on abuse of the environment, since citizens with clear rights and knowledge and access to a legal system that allows speedy redress can exercise a powerful restraint on those contravening health and environmental regulations.

The Commission's main general recommendations were:

- All governments and international agencies should give higher priority to developing a sustainable basis for the health of their people and countries. Achieving such a sustainable basis for health requires high priority in development policy to reducing population growth, overconsumption and waste generation.

- A rapid and sustained fall in population growth rates is best achieved by providing people with the knowledge and means to control fertility and by dealing with the economic, social, and cultural reasons for large families. The knowledge, capacity, and health of people are the most valuable resource for development; higher priority must be given to primary health

care (including family planning) and education for all groups, especially women.

- Responsible action should be taken at all levels from the individual citizen to the government to reduce overconsumption and the generation of wastes, especially wastes with serious adverse health and environmental effects. High priority should be given to creating awareness and to providing economic and other incentives to encourage conservation and efficient use of resources. The long-term goal is the promotion of lifestyles and patterns of consumption that are consistent with sustainability of development and with health for all.

- Government structures should be changed to give greater priority and support to participation and community-based initiatives. Official bodies and scientific advisers should devise and apply new more participatory ways of working with the poor so that perception of their needs and their knowledge can be used in designing, implementing, and monitoring action.

- Changes should be made in the planning process for social and economic development and in the institutional and regulatory structures of governments to give stronger emphasis to the prevention of environmental pollution, intersectoral decision-making, and participation.

- Governments and aid agencies should give high priority to providing the means and building up the capacity needed by each locality to make the best use of local knowledge, skills, and resources to promote health and environmental quality. This includes providing the education and training needed to enable individuals and organizations to protect the environmental foundation of their own health.

- Governments and international agencies should give higher priority to creating the basis of an international consensus on environmental, economic, and health issues with the aim of alleviating poverty and sustaining the quality of the environment.

- Governments, international agencies, and public and private institutions should develop the national capacity for the systematic collection, analysis, and monitoring of environmental effects on health in the context of development, so that government policies on health promotion and environmentally sound management of industrial development and of rural and urban settlements are based on reliable information.

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ANNEX 1

Members of the WHO Commission on Health and Environment

Chairman

Mrs Simone Veil, France
Member, European Parliament since 1979
President, European Parliament, 1979-82
Minister of Health, 1974-79

Vice-Chairmen

Dr Emil Salim, Indonesia
Minister of State for Population and the Environment since 1983
Head of the Environmental Impact Management Agency since 1990
Member of the Indonesian Academy of Sciences since 1981
Member of the People's Consultative Assembly since 1987

Professor Nikolai F. Izmerov, USSR
Director, Institute of Industrial Hygiene and Occupational Diseases, USSR Academy of Medical Sciences since 1971
Assistant Director-General of WHO, 1964-71
Deputy Minister of Health of the Russian Federation, 1961-64
Academician Secretary, USSR Academy of Medical Sciences

Members[1]

Dr Chen Chunming, China
President, Chinese Academy of Preventive Medicine since 1983
Chairman, National Committee on Health Standards since 1984
Professor of Nutrition, Chinese Academy of Preventive Medicine since 1965

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[1] Unable to attend:

Professor Harald zur Hausen, Federal Republic of Germany
(Director, German Cancer Research Centre)

Dr Saburo Okita, Japan
(Chairman, Institute for Domestic and International Policy Studies; President and Chancellor, International University of Japan; Minister for Foreign Affairs, 1979-80; Chairman, Japanese World Wide Fund for Nature)

Sir Richard Doll, United Kingdom
Emeritus Professor, University of Oxford
Member of Royal Commission on Environmental Pollution, 1973-79
Regius Professor of Medicine, University of Oxford, 1969-79

Dr Abraham Horwitz, Chile
Director Emeritus, Pan American Health Organization
Director, Pan American Health Organization and WHO Regional Office for the Americas, 1959-75
Chairman ACC Subcommittee on Nutrition since 1985
Chairman of the Board of the Pan American Health and Education Foundation since 1988

Professor John M. Hunter, United States of America
Professor, Departments of Geography and Community Health Sciences, and African Studies Centre, Michigan State University since 1967
Lecturer on Geography, Durham University, United Kingdom, 1964-67

Dr Mohammed Kassas, Egypt
Emeritus Professor, Department of Botany, Cairo University
President, International Union for the Conservation of Nature and Natural Resources, 1978-84
Member of the Club of Rome
Member of the Egyptian Academy of Science
Recipient, United Nations Prize for Environment

Dr Roelof J.H. Kruisinga, The Netherlands
President, Committee on Accreditation of Inspectorates and Laboratories since 1990
Member of Senate, 1981-91
Director General of the Dutch Ministry of Public Health, 1979-82
Minister of State for Public Health and Environment, 1967-71
Minister of State for Transportation and Public Works, 1971-73

Dr Philippe Lazar, France
Director General, National Institute of Health and Medical Research since 1982

Dr Adetokunbo O. Lucas, Nigeria
Director, International Health Programs, Department of Population and International Health, Harvard School of Public Health, since 1990
Director, UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases, 1976-86
Chairman, Medical Research Council of Nigeria, 1973-76

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Professor Diogo Pupo Nogueira, Brazil
Professor Emeritus, School of Public Health, University of São Paulo
Chairman, Special Commission on Occupational Health, University of São Paulo
Secretary, Brazil International Commission on Occupational Health

Professor Sten Orrenius, Sweden
Director, Institute of Environmental Medicine, Karolinska Institute since 1988
Professor and Chairman, Department of Toxicology, Karolinska Institute since 1984

Dr David P. Rall, United States of America
Director, National Institute of Environmental Health Sciences, 1971-90
Director, National Toxicology Programme, 1978-90

Professor Vittorio Silano, Italy
Director-General for Food Hygiene and Nutrition, Ministry of Health since 1990
Director-General for Prevention of Environmental Pollution and for Environmental Reclamation, Ministry of Environment, 1987-89
Director, Department of Comparative Toxicology and Ecotoxicology, Istituto Superiore di Sanità, 1982-87

Dr Frank E. Young, United States of America
Deputy Assistant Secretary for Health, Science and Environment since 1989-present
Commissioner, Food and Drug Administration, 1984-89
Dean, School of Medicine and Dentistry, University of Rochester, New York, 1979-84
Vice President for Health Affairs, University of Rochester, Rochester, New York, 1981-84
Chairman, Department of Microbiology, University of Rochester, Rochester, New York, 1970-79

Chairmen of Panels

Mr Mamadou Diop, Senegal[2] (Panel on Urbanization)
Mayor of Dakar
President, Thirty-fifth World Health Assembly 1982
Minister of Health

[2] * In the absence of Mr M. Diop, Dr B.W. Christmas served as Chairman of the Panel on Urbanization

Advocate-General of the Supreme Court
Minister of Public Works, Transport and Town Planning

Dr Bernard D. Goldstein, United States of America (Panel on Industry)
Director, Environmental and Occupational Health Sciences Institute since 1986
Professor and Chairman, Department of Environmental and Community Medicine, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School since 1980
Assistant Administrator for Research and Development, Environmental Protection Agency, 1983-85

Professor E.H. Kampelmacher, Netherlands (Panel on Food & Agriculture)
Deputy Director General, National Institute for Public Health and Environmental Hygiene, 1984-86
Scientific Director, National Institute for Public Health and Environmental Hygiene, 1973-84
Professor of Food Microbiology and Hygiene, Agricultural University, Wageningen, 1971-85

Dr Barbara H. MacGibbon, United Kingdom (Panel on Energy)
Assistant Director (Medical), National Radiological Protection Board since 1988
Senior Principal Medical Officer, Division of Toxicology and Environmental Health, Department of Health, 1983-88
Senior Lecturer/Senior Research Fellow, St Thomas Hospital Medical School, London

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